



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,259	04/10/2006	Kazuo Chikaraishi	Q94302	8807
23373	7590	06/15/2009	EXAMINER	
SUGHRUE MION, PLLC			YEAGLEY, DANIEL S	
2100 PENNSYLVANIA AVENUE, N.W.				
SUITE 800			ART UNIT	PAPER NUMBER
WASHINGTON, DC 20037			3611	
			MAIL DATE	DELIVERY MODE
			06/15/2009	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/575,259	CHIKARAISHI, KAZUO	
	<b>Examiner</b>	<b>Art Unit</b>	
	Daniel Yeagley	3611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 10 March 2009.

2a) This action is **FINAL**.                    2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-6 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 1-6 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 10 March 2009 is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All    b) Some \* c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.

4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.

5) Notice of Informal Patent Application

6) Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Endo et al 5,732,790; in view of in view of Fecht et al EP386439; in further view of Pantages 2,712,584.

Endo discloses an electric power steering apparatus that assists steering of a steering shaft by rotation of an electric motor 117 through a reducer 115 based on a steering torque detected by a torque sensor 105, wherein the steering apparatus of Endo detects an absolute angle in an entire range of the steering wheel and comprises a rotary potentiometer 420 disposed in a reducer of the steering apparatus that detects the rotation angle of a steering shaft (figure 10 - 20), and has a portion of a swing arm 420b of a potentiometer engaged with a groove disposed in the reducer, and has a swirl groove 411d formed to a to-be-detected member, wherein the reducer comprises a worm wheel 405 separated from the swirl groove, such that the groove is formed to detect revolutions of a steering shaft 411 and corresponds to a range of movement of the steering wheel (column 7 – 22) and has a portion of a potentiometer swing arm swingingly rotated according to a rotation of a worm wheel in the reducer and engaged with a groove, but failed to show the swirl groove being formed on a side of a worm wheel such that the grooves are formed to detect three revolutions of a steering wheel in correspondence to a range from lock to lock of a rotation movement of a steering wheel.

Fecht shows a rotary potentiometer for a steering apparatus, which shows the prior art of providing swirl grooves being disposed on a side of a gear wheel 13 of the potentiometer, wherein the swirl groove 19 detects rotation angle of the steering shaft 10 (abstract), wherein the rotation angle is detected by an absolute angle in an entire range of the steering wheel and has grooves formed in the wheel gear that detect a corresponding range of the steering wheel ; as shown in figure 1, that appear to detect three revolutions of the steering wheel, but failed to clearly show the swirl groove 19 only making three revolutions.

Pantages shows a potentiometer that is used to detect a rotation angle of a rotating member that utilizes a swirl groove 34 on a to-be-detected member, wherein the swirl groove is formed on a side of a wheel gear for detecting a rotation angle of a shaft that shows the prior art of utilizing a swirl groove formed to detect three revolutions that correspond to a range from lock to lock of the rotating member; as shown in figure 3, to limit the rotation to provide a specified control value (column 1 – 9).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the steering apparatus of Endo's reducer and potentiometer measuring means and provided the potentiometer groove on the side of Endo's wheel gear mechanism; like that suggested by Fetch's potentiometer swirl groove, to equally provide a means for measuring the rotational movement of the wheel gear; as taught by Fetch's swirl groove, and would have been obvious to one of ordinary skill to have further modified the swirl groove as modified by Fetch; with a rotational limit of three revolutions; as suggested by Pantages potentiometer, in order to provide or restrict the desired amount of predetermined resistance associated with a transition point of the potentiometer to a limited amount by limiting

the revolutions by a stop means; for example three revolutions as taught by Pantages, in order to provide a means for limiting the value of inductance or resistance to a preferred value; as taught by Pantages and to reduce respond time to a neutral position by providing limit stops in the swirl groove; as is well known in the art and would have been a matter of design choice for attaching the groove for the pin guided potentiometer to a restricted number of rotations with a more precise accurate measurement of a rotary signal; as further taught by Fecht.

3. Claims 2 – 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Endo et al ‘790; as modified by Fecht ‘439 and Pantages ‘584, in further view of Tachiiri et al 2003/0070885.

Endo discloses an electric power steering apparatus for assisting steering of a steering shaft having a rotary potentiometer disposed in a reducer, wherein the swirl groove for the potentiometer is formed on a to-be-detected member separated from the worm wheel gear and, as modified by grooved end face of the gear wheel of Fecht potentiometer; as modified by Pantages; as stated above, wherein the wheel gear of Endo is molded integrally and formed on an outer peripheral surface of a wheel gear for detecting a rotation angle of a steering shaft; as modified; wherein Endo suggests using a resin material with the potentiometer to reduce heat conductively and provide a more precision detection device, but failed to disclose the composition of the worm wheel gear being a metal core with a resin portion formed on the outer peripheral surface of the wheel.

Tachiiri discloses a worm wheel gear 65 which teaches the art of composing a wheel gear manufactured with a method that uses a resin material molded integrally with a wheel gear which is formed having a metal core portion (paragraph 38).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified the reducer and potentiometer arrangement of Endo; as modified by the revolution limited side face swirl grooved wheel gear of Fecht potentiometer; as modified by Pantages, and would have been obvious to have manufactured the grooved worm wheel as modified; using a metal core part for fixing the gear wheel about the shaft and molding the gear with a resin outer peripheral surface; as is old and well known in the art for providing a rigid center gear portion with the added benefits of a resin outer surface for a worm wheel and in association with a potentiometer in order to prevent the induction of heat convention; as suggested by Endo for a more accurate reading and where attaching a resin gear ring integrally on the outer circumference of a rim of a metal worm wheel is commonly used in the gear art to prevent a decrease in the transmission efficiency or to increase the weight, to reduce driving noise and to make lubricant supply unnecessary.

#### ***Response to Arguments***

4. Applicant's arguments with respect to claims 1 – 6 have been considered but are moot in view of the new ground(s) of rejection; as now claimed.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., triangle wave output and swing rotation angle of swing arm are not recited in the rejected claim(s). Although

the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

### ***Conclusion***

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hasting '573 shows a wheel gear mechanism with a limited number of swirl grooves formed on a side portion of a wheel gear mechanism that is used for providing a positive stop action (lock to lock) to a rotating wheel.

Staudt et al '341 and '499, Suda et al 'JP'974 and Andonian et al '072 show a wheel gear mechanism with a swirl groove formed therein.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Yeagley whose telephone number is (571)272-6655. The examiner can normally be reached on Monday - Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Dickson can be reached on (571) - 272 - 6669. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

D.Y.

/Lesley D. Morris/  
Supervisory Patent Examiner, Art Unit 3611